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Trend Adjustment to the LEI

By

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This paper describes the way The Conference Board (TCB) will reintroduce a trend adjustment to the Leading economic index (LEI). This revision is consistent with long-standing TCB policy to make changes to the indexes when research indicates substantial improvements are possible.

The new procedure derives from research responding to discussion of a TCB proposal to change the way the yield spread is incorporated into the TCB Composite Index of Leading Indicators (LEI). In the course of this discussion with the TCB Advisory Panel on business cycle indicators the effect of the change in LEI composition on the LEI trend became an issue.

The proposed change in the way the yield spread is introduced is discussed in an accompanying article by Victor Zarnowitz and Dara Lee. In looking at the effect of this change on the trend in the index, two things became clear. First, without a “fixed” trend the LEI changes every time the composition of the index changes and makes it very difficult to evaluate alternative indexes. The change in levels can also be very confusing to users. Second, since the LEI is constructed from various series, some with and some without trends, its trend is arbitrary and has no real meaning. While this does not affect the cyclical properties of the LEI, it is of some concern to users who focus on levels. In this paper we discuss the way The Conference Board dealt with this issue.

The LEI is designed to predict turning points in the composite index of coincident indicators (CEI), a measure of current economic activity. The choice of the components and the methodology used in the index are made with that goal in mind. Having a

meaningful trend has not been a consideration in the process of choosing components and methodology for the LEI. Some components of the LEI have their own upward trends. Others are either stationary or have no definite, persistent trends. Hence, LEI as a whole has a growth trend that lacks a clear economic meaning, being a result of a mixture of trending and trend-less time series. This lack of a meaningful trend in the LEI itself is not something new. It was a feature of the approach since its beginning at the NBER.

As the LEI is currently constructed, changes in the components of the LEI can lead to large changes in its trend even while improving its cyclical properties. A recent example is the proposed change in the way the interest rate spread is incorporated into the LEI. This change significantly increased the trend in the LEI. Such a change can be confusing for users who focus on levels of the LEI. It also makes it difficult to evaluate the effect of a change in the composition of the index on the cyclical behavior of the index independently of the effect of the change on the trend of the index.

In the course of our research on how to deal with these problems it became clear that a trend adjustment by replacing the existing trend in LEI with the trend in CEI would be useful. This adjustment would achieve two goals:

1. The trend of the LEI would remain “fixed” when changes are made to the composition of the index.
2. It would provide a more meaningful trend to the LEI.

Both these goals are worthy and can be achieved with restoration of the trend adjustment procedure that was part of longstanding practice in the LEI going back to when production of the indexes was at the U.S. Department of Commerce.¹ Since there are number of ways to implement this adjustment, the rest of the paper outlines how we plan to do it.

¹ Until 1989 the LEI was trend-adjusted to an average of the trends in the components of the coincident index (CEI). Between 1989 and 1993 the three indexes were trend-adjusted to the trend in GNP. In 1993 the trend adjustment for the three indexes was eliminated because the trend of the CEI and GNP were very similar as a result of new methodological procedures implemented at that time. An unintended by-product

An Appendix offers a brief discussion of some alternatives that we considered. Research will continue on trend adjustment procedures, but it was decided that by introducing a procedure now, we would fix the problem with the current index and make the effects of the new yield spread measure more transparent and meaningful.

In the method we adopt (the additive method), we add an adjustment factor to the monthly growth rate of the LEI. The adjustment factor is computed by subtracting the average monthly growth rate of the LEI from the average monthly growth rate of the CEI. Currently, the average monthly growth rates of the CEI and LEI over the period 1959-2003 are 0.216 and 0.230, respectively. The adjustment factor would be: $-0.014=0.216-0.230$. This adjustment factor is added every month to the growth rate of the LEI.

This method is similar to the one used by the Bureau of Economic Research (BEA) until 1993². It assumes that the trend of the CEI is linear with a constant growth rate over the entire sample period. Thus, the trend can be considered a linear approximation of the growth in economic activity.

One drawback to this method is a possibility that the turning points of the trend adjusted LEI index could shift arbitrarily because adding the mean growth rate from the CEI to the LEI (assuming it is steeper than the trend in the LEI) could turn small negative monthly growth rates in the LEI into positive changes. This is an undesired consequence but in practice for the U.S. LEI this effect is negligible. When the trend of the CEI is smaller than the trend of LEI, which is the case for some of the foreign countries that TCB creates indexes for, adding the mean growth rate from the CEI could turn some small positive monthly growth rates in the LEI into negative changes and lead to extra cycles in the LEI.

of this change was that the LEI was left with a trend that depended on its own components, had no economic meaning, and shifted arbitrarily with every change in the components of the LEI.

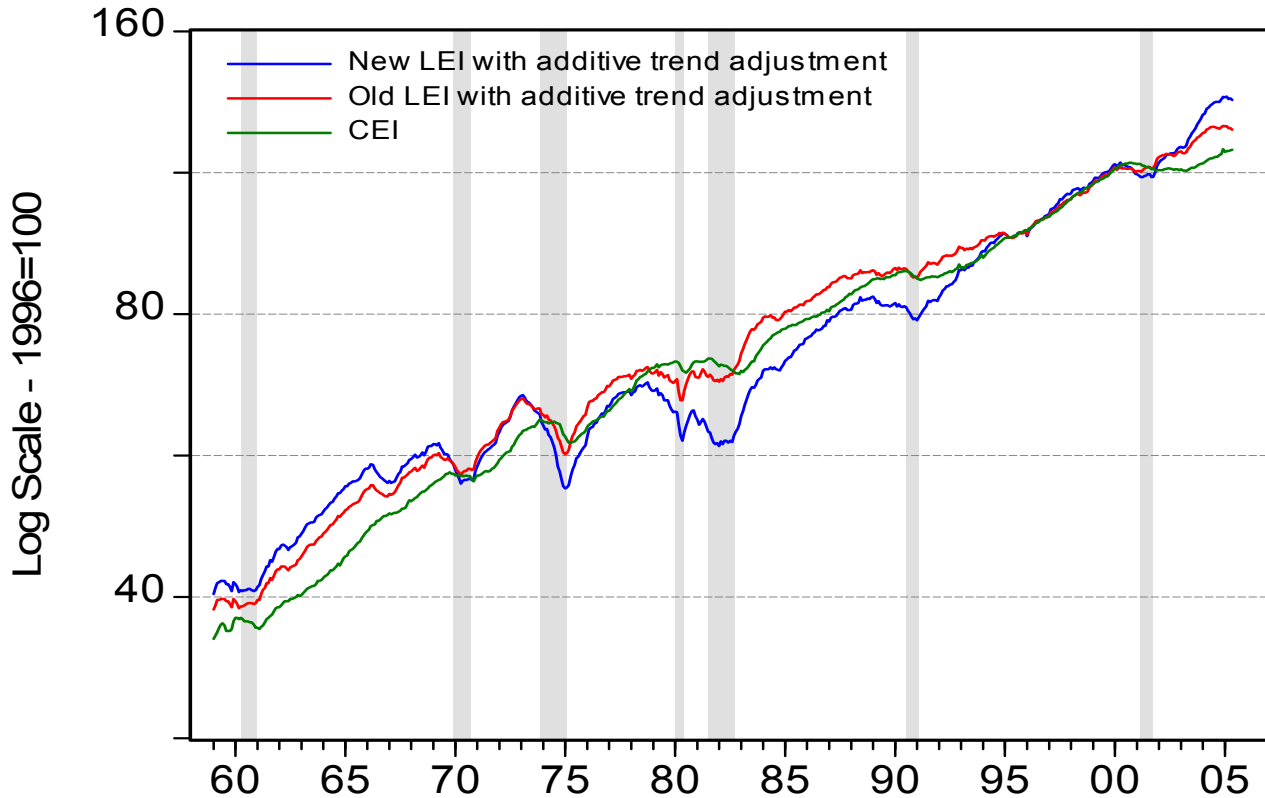
² Except that we now use the trend of the CEI, not GNP, as the target trend.

By coincidence, after the latest change to the U.S. LEI (the change to the interest rate spread), the average growth rates of the LEI and the CEI are almost identical. Therefore, for the current yield spread change the trend adjustment has very little impact on the LEI (Figure 1).

Overall, the additive trend adjustment method achieves the two goals we set for the trend adjustment: having a trend that will remain constant when changes are made to the composition of the LEI, and adding some economic meaning to the trend by making the trend of the LEI similar to that of the CEI. By implementing it we re-institute a procedure, which was used for many years at the BEA and NBER.

At this point, we are satisfied with equating the average growth rate of the LEI and CEI over the entire sample in order to equalize their trends. As a result of this trend adjustment, the turning points in the LEI could possibly shift slightly, i.e., leads at peaks could get shorter and at troughs longer. However, the combined benefits of a smoother LEI with fewer extra cycles resulting from the revisions implemented in July 2005 should outweigh the drawbacks of the possibility of a shortening in lead times and increase the reliability of the LEI. The Conference Board research program on business cycle indicators will continue to explore other methods of trend adjustment and evaluate their effectiveness on the usefulness of the LEI.

Peak:	60:4	69:12	73:11	80:1	81:7	90:7	01:3
Trough:	61:2	70:11	75:3	80:7	82:11	91:3	01:11



Appendix: A Note on Alternative Trend Adjustment Methods

There are many ways to adjust the trend in the LEI so that it matches the trend of the CEI. All involve various tradeoffs and TCB continues its research in this area, despite the fact that the old method provides a useful methodology. Another way to calculate the trend is segmenting the sample into discrete time intervals and then applying linear trends to each sub period separately. This amounts to a piecewise linear trend. For example, one could calculate the mean of the monthly changes over two sub-periods, 1959-1983 and 1984-present. Still another alternative is using a nonlinear trend such as the Hodrick-Prescott or the Phase Average Trend. Each of these methods raises serious issues. For example, using non-linear filters like the H-P or PAT raises serious end-point problems and how to choose the segments is an issue.³

³ Even with using the simple mean for the trend adjustment, end-point problems still exist.

We also considered a multiplicative method for trend adjustment. In this method, instead of removing the old trend and adding a new trend, we multiply the growth rates of the LEI by a factor that scales the trend of the LEI to match the target trend, the trend in the CEI.⁴ The main advantage of this method is that the turning points are unaffected by the trend adjustment. The disadvantage is that the cyclical amplitude of the leading index can change in a significant way. Using the additive method, the amplitude will not change dramatically. However, in the multiplicative method, if the adjustment factor is greater than 1, the amplitude of the movements in the adjusted index will increase. On the other hand, if the factor is less than 1 the amplitude of the adjusted index will decrease. Moreover, whether the adjustment factor is greater or less than 1 will depend on the ratio of the arbitrary LEI trend (before adjustment) to the trend in the CEI. It is unclear how to evaluate the optimal size of the amplitudes. Larger amplitudes will better emphasize signals before recessions, but at the same time they will also better emphasize false signals, and they will apply to the trend-cyclical as well as irregular movements.

Exploring the full range of options is an active research project at TCB. For now we decided to focus on the simple mean of the monthly changes in the CEI, a procedure with a long history in indicator work, and leave other possibilities for future research.

⁴ For another example using this trend adjustment method see Dua and Banerji, "A Leading Index for the Indian Economy," Center for Development Economics Working Paper No. 90, March 2001.